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EXAMINER

PROCTOR, JASON SCOTT

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/008,270

Applicant(s)

CAVANAGH ET AL.

Examiner

Jason Proctor

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 7, 8, 18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-17 and 20-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/11/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***DETAILED ACTION***

Claims 1-29 were presented for examination and rejected in Office Action dated March 9, 2005. Claims 1, 9, 12, 20, and 23-29 have been amended, claims 7-8 and 18-19 have been cancelled, and new claims 30-35 have been added in Applicants' response dated April 11, 2005. Claims 1-6, 9-17, and 30-35 remain pending.

Claims 1-6, 9-17, and 30-35 have been rejected.

***Response to Rejections under 35 U.S.C. § 102***

Regarding claims 1-22, Applicants argue for claim 1 in reference to "a hub coupled to the first node and the second node, wherein the hub is configured to route the message packets from the first node to the second node and from the second node to the first node". Applicants argues primarily that:

Thus, Feinberg's simulation components communicate PDUs directly with each other to perform a distributed simulation. Furthermore, Feinberg's teachings that his invention operates "in the background" (see, e.g., Feinberg, col. 7, lines 13-19) and "without disturbing how the distributed simulation operates" (see, e.g., Feinberg, col. 4, lines 27-28) teaches away from operating the control computer as a hub or inserting a hub. (Emphasis in original.)

Applicants conclude that:

Accordingly, Feinberg's control computer gathers data for analysis. Feinberg's control computer is not "a hub coupled to the first node and the second node, wherein the hub is configured to route the message packets from the first node to the second node and from the second node to the first node" as recited in claim 1.

Applicants argue similarly for independent claim 12 in stating that:

Claim 12 recites a combination of features including: "communicating at least signal values during the simulating using message packets formatted according to a grammar; and routing the message packets through a hub coupled to the first node and the second node". The teachings of Feinberg highlighted above with regard to claim 1 also do not teach the above highlighted features of claim 12. (Emphasis in original.)

The Examiner respectfully traverses this argument as follows.

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The Examiner notes that Applicants have not cited support for this argument from the disclosure of the application. The merits of the argument therefore lie in the interpretation of the Feinberg reference. Applicants allege primarily that the control computer cannot be interpreted as “a hub”. The Examiner remarks that the subsequent claim language directed toward routing message packets between nodes is, by definition, the function of a network hub.

The Examiner agrees that Feinberg’s control computer “gathers data for analysis” as Feinberg explicitly teaches (column 6, lines 12-20, emphasis added):

At step 430, data gathered by the executing agent-applications 360 and/or pre-analyzed data as described above in step 420 is transmitted to the local control software 210 preferably to a data module 340 of the control software 210. Data module 340 may store the transmitted data in a database 350 for later use such as analysis by one or more of the tools 240, 250, or 260 or data module 340 may provide transmitted data directly to one or more of the tools 240, 250, and 260.

The agent-application is a component of “simulator 100”, as can be seen from Figs. 2 and 3 and column 5, lines 9-14. At this citation Feinberg explicitly teaches data transmission in at least the direction of simulator to control computer.

Feinberg explicitly teaches transmission in the direction of control computer to simulator (column 7, lines 19-25, emphasis added):

In a preferred embodiment of the invention, simulation components can be managed by the control computer (e.g., the control computer may instruct the simulation components to turn on or turn off or go left, etc.). This capability can be useful for a number of reasons which will be apparent to those skilled in the art including correcting a malfunction in a simulation component or minimizing the effect of a malfunction in a simulation component on the distributed simulation overall.

The Examiner thanks Applicants for providing an interpretation of Feinberg’s system regarding the communication of PDUs. However, from the sections above, it is clear that Feinberg’s control computer is in communication with the simulators, receives data from the simulators for analysis, and in a preferred embodiment can control the simulators. Thus the control computer is indeed a hub in the distributed simulation taught by Feinberg.

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Applicants' arguments are unpersuasive. The limitations of claims 1 and 12 are taught by Feinberg.

*Response to Rejections under 35 U.S.C. § 103*

Regarding the rejection of claims 23-27, Applicants argue for claim 23 in reference to "a first model comprising a representation of logic to perform a non-blocking assignment and logic to schedule a call of at least a first code sequence responsive to the non-blocking assignment, and the first code sequence comprising instructions executable to sample output signals and drive input signals of a second model" (emphasis in original). Applicants argue primarily that:

Applicants respectfully submit that even if, *arguendo*, the analysis in the Office Action is correct and incorporating non-blocking assignments into the simulation would be obvious, that still would not teach or suggest "a first model comprising ... logic to schedule a call of at least a first code sequence responsive to the non-blocking assignment". Furthermore, the above reasoning from the office action would not teach or suggest "the first code sequence comprising instructions executable to sample output signals and drive input signals of a second model" as recited in claim 23.

The Examiner respectfully traverses this argument as follows.

A summary of the rejection of the previous Office Action would read as follows: It would have been obvious to validate a standards-compliant device according to that standard using the distributed simulation of Feinberg. The rejection shows the distributed simulation, shows the concepts as known in the art and taught by a "Handbook of Simulation", and refers to the particular industry standards taught in Applicants' specification. Further, Feinberg's simulation is concerned with validation (column 6, lines 21-37; and others).

Applicants allege that it would not be obvious, in view of the cited references, to simulate a standards-compliant logic device in accordance with the particular standard (by referring to the

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standards-compliant logic as recited in the claim.) The Examiner addressed this issue in the previous rejection:

When the nature of the problem to be solved includes “non-blocking assignment”, it would be obvious to a person of ordinary skill in the art at the time of Applicant’s invention to incorporate “non-blocking assignment” in the simulation of such a system. Indeed, Applicant admits that “non-blocking assignment” is a known component of the IEEE 1364-1995 standard, therefore it would have been obvious to incorporate “non-blocking assignment” in a simulation of a device compliant with IEEE 1364-1995 in accordance with principles well known in the art, such as validation as taught by Banks.

Applicants fail to cite support from the disclosure or provide any evidence to substantiate the allegation that it would not be obvious to a person of ordinary skill in the art to simulate and validate standards-compliant logic by using logic that complies with the standard.

Applicants’ arguments are unpersuasive.

Applicants additionally argue that:

The Office Action states that “motivation to do so would be found in the nature of the system for which the simulation is designed, as well as the knowledge of one of ordinary skill in the art” (Office Action, page 11, last sentence). Such a broad, conclusory statement does not meet the requirements of a *prima facie* case, in which particular findings of motivation must be set forth and substantial evidence must be provided (see, e.g., *In re Kotzab*, 55 USPQ2d, 1313, 1317 (Fed. Cir. 2000) [...])

The Examiner respectfully traverses this argument as follows.

MPEP 706.02(j), “Contents of a 35 U.S.C. 103 Rejection”, reads as follows:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

MPEP 2143.01, “Suggestion or Motivation to Modify the References”, reads as follows:

“There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.” *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457- 58 (Fed. Cir. 1998)

The rejection of the previous Office Action asserted that the problem to be solved is the simulation of a standards-compliant logic device. The nature of the problem to be solved

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requires certain means of implementing a simulation of a standards-compliant logic device. It stands to reason that a person of ordinary skill in the art would simulate a standards-compliant logic device by using standards-compliant logic, since the nature of the problem to be solved leads directly to that solution. A person of ordinary skill in the art would reasonably expect any other solution to suffer from non-compliance with the standard, greater effort to implement, or both.

The rejection of the previous Office Action relied, in part, on the Banks reference titled "Handbook of Simulation". This reference is a textbook, and as such is regarded as "generally available to one of ordinary skill in the art" of simulation. A person of ordinary skill in the art or simulation would possess the knowledge found in a handbook for that art. The sections of this reference cited in the rejection come from chapters 1 and 2 of that reference and therefore cannot be construed as esoteric or advanced.

Applicants' arguments are unpersuasive.

Regarding the rejection of claims 28-29, Applicants argue for claim 28 in reference to "count timesteps in a distributed simulation system; and cause a cycle based simulator to evaluate a clock cycle in a model responsive to a number of the timesteps equaling a number of timesteps per clock cycle of a clock corresponding to a model" (emphasis in original). Applicants argue primarily that:

Banks teaches that "Activity scanning produces a simulation program composed of independent modules waiting to be executed. Scanning takes place at fixed time increments at which a determination is made concerning whether or not an event occurs at that time. If an event occurs, the system state is updated." (Banks, page 9, section 1.4.3). Banks' scanning at fixed time increments to determine if an event occurs and optionally updating system state has nothing [sic] to do with a cycle-based simulator. Particularly, this

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scanning for events at fixed time intervals has nothing to do with causing “a cycle-based simulator to evaluate a clock cycle in a model”.

The Examiner respectfully traverses this argument as follows.

Where Applicants’ claim recites “count timesteps in a distributed simulation system”, the Examiner has shown Feinberg’s distributed simulation combined with Banks’ teaching of “scanning at fixed time increments”. If Applicants’ timesteps are not equivalent to “fixed time increments”, the Examiner respectfully requests clarification and support in the disclosure for this interpretation.

Where Applicants’ claim recites “cause a cycle-based simulator to evaluate a clock cycle in a model responsive to a number of the timesteps equaling a number of timesteps per clock cycle of a clock corresponding to the model”, the Examiner has shown that Banks teaches:

If a specified condition is met, a rule is *fired*, meaning that an action is taken.

For clarity, the Examiner has interpreted “[the number of timesteps] equaling a number of timesteps per clock cycle of a clock corresponding to the model” as Banks’ “specified condition”. The Examiner has interpreted “evaluate a clock cycle in a model” as Bank’s instruction that “an action is taken”. Banks’ most certainly teaches a “cycle-based simulator”, as “scanning at fixed time increments” is functionally equivalent to “scanning in a cycle-based manner”. Further, the broadly recited limitation of “evaluat[ing] a clock cycle in a model” is an integral step of “scanning in a cycle-based manner”; it would be impossible to determine that a “fixed time increment” or a “cycle” has occurred without “evaluat[ing] a clock cycle in a model”.

Applicant further argues:



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Furthermore, even if, *arguendo*, Banks did teach cycle-based simulators in general, this would still not teach or suggest “count timesteps in a distributed simulation system; and cause a cycle-based simulator to evaluate a clock cycle in a model responsive to a number of the timesteps equaling a number of timesteps per clock cycle of a clock corresponding to the model”.

The Examiner has addressed this argument above and finds it unpersuasive. Feinberg teaches the structure of the distributed simulation system as claimed; Banks teaches a cycle-based simulator referred to as “activity scanning” as explained above.

Applicant further argues:

Still further, the *prima facie* case of obviousness of claims 28-29 has not been established because a proper motivation has not been set forth, as highlighted above with regard to claims 23-27.

The Examiner has addressed this argument above and finds it unpersuasive.

### ***Response to Rejections under 35 U.S.C. § 101***

The Examiner thanks Applicant for amending claims 22-29 to be tangibly embodied. Regarding the rejection of claims 1-22, Applicants argue primarily that:

A simulation result is concrete and tangible, representing operation of the system under test when simulated in the fashion performed during the simulation.

The Examiner respectfully traverses this argument as follows.

A simulation result is not necessarily tangible. In the case of a mathematical simulation or a simulation executed by a computer, a “simulation result” is the product of mathematical operations and therefore intangible. Two examples of granting a tangible form to the simulation results would be displaying the results on a display screen or communicating them through a network to another computer.

Applicants’ argument that a simulation result is concrete and tangible is unpersuasive. However, Applicants’ amendments to claims 1 and 12 include reciting a “hub coupled to the first

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node and second node". The Examiner regards this as sufficient structure, in the context of a "distributed simulation system", to establish that the simulation results do constitute a transformation outside of the computer in the form of communication through a network to another computer.

The rejections under 35 U.S.C. § 101 of the previous action are withdrawn.

### ***Response to Nonstatutory Double Patenting Rejection***

Applicants have requested that this rejection be held in abeyance until the claims are otherwise indicated allowable. The Examiner will hold this rejection in abeyance.

### ***Outstanding Rejections***

#### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1 and 12 are provisionally rejected under the judicially created doctrine of double patenting over claims 1 and 27 of copending Application No. 10/008,255. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

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The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: a distributed simulation system comprising two nodes, each node using a different simulator program ("simulation mechanism"), wherein the first node and the second node communicate using a grammar.

Claim 12 of the instant application recites the method employed by the apparatus of claim 27 of the copending application.

This rejection will be held in abeyance until the claims are otherwise indicated allowable, as per Applicants' request.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 12, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,901,903 to Feinberg et al. (Feinberg).

Regarding claim 1, Feinberg teaches a distributed simulation according to the claimed invention. In particular, Feinberg teaches a distributed simulation with a plurality of nodes, the nodes are configured to simulate portions of a system under test, the simulator programs on

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different nodes use different instruction code, and the nodes communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-67). Official notice is taken that instruction code for the Windows NT™ operating system differs from instruction code for the Sun Solar 15™ operating system. Official notice is taken that computer programs communicate using a grammar.

Feinberg teaches that the control computer “gathers data for analysis” (column 6, lines 12-20). Feinberg explicitly teaches transmission in the direction of control computer to simulator (column 7, lines 19-25). Thus Feinberg teaches that the control computer is a “hub” as recited by claim 1.

Feinberg teaches that it is known in the art to establish communication in a distributed simulation (column 1, lines 13-16). It is inherent that computer data communication uses message packets. It is inherent that computer data communication uses a grammar. Feinberg teaches a computer control, constituting a hub, coupled to the simulation nodes, wherein the computer control is configured to route message packets (Fig. 2; column 5, lines 44-67; column 6, lines 12-20).

Additionally, although this feature is not specifically claimed, Feinberg teaches “simulation agnosticity” by exhibiting “Simulation component B” which operates on a “black box”, an unknown and unspecified simulation platform for measuring M1A1 tank operations, yet nevertheless participates in the larger distributed simulation system.

3. Claim 12 recites the method employed by the system of claim 1 respectively, and are therefore rejected for the same reasons given above for claim 1.

4. Regarding claim 30, Feinberg teaches a distributed simulation according to the claimed invention. In particular, Feinberg teaches a distributed simulation with a plurality of nodes, the nodes are configured to simulate portions of a system under test, the simulator programs on different nodes use different instruction code, and the nodes communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-67). Official notice is taken that instruction code for the Windows NT™ operating system differs from instruction code for the Sun Solar 15™ operating system.

Feinberg teaches that the control computer “gathers data for analysis” (column 6, lines 12-20). Feinberg explicitly teaches transmission in the direction of control computer to simulator (column 7, lines 19-25). Thus Feinberg teaches that the control computer is a “hub” as recited by claim 1.

Feinberg teaches that it is known in the art to establish communication in a distributed simulation (column 1, lines 13-16). It is inherent that computer data communication uses message packets. Feinberg teaches a computer control, constituting a hub, coupled to the simulation nodes, wherein the computer control is configured to route message packets (Fig. 2; column 5, lines 44-67; column 6, lines 12-20).

5. Claims 2-6, 13-17, and 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feinberg, as applied to claims 1 and 12, respectively, in view of “Handbook of Simulation”, edited by Jerry Banks (Banks).

Regarding claim 2, Feinberg does not explicitly teach whether the simulations shown are event-based simulations. However, Banks teaches that event-based simulations are well known in the art (§1.4.2, page 9, Event-Scheduling Method). It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Regarding claim 3, Feinberg does not explicitly teach that the first simulator and the second simulator have different event schedulers. However, Feinberg does teach that the simulations are embodied on different operating systems (Fig. 2, Windows NT™ operating system and Sun Solar 15™ operating system). Feinberg does teach that the operating systems are multitasking operating systems (column 7, lines 5-19). Official notice is taken that multitasking operating systems use schedulers to obtain process concurrency and that various scheduling algorithms are known in the art.

Further, Banks teaches the concept of *validation*, which asks whether the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use different schedulers for different event-based simulations in order to

uphold principles well known in the art, such as those found in a handbook of simulation. Therefore it would have been obvious to build the distributed simulation system as taught by Feinberg, using event-based simulations with the particular scheduler that accurately represents the real system and therefore adheres to the principle of *validation* as taught by Banks. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Regarding claim 4, the specification (page 24, lines 25) teaches a “non-blocking assignment” as “The non-blocking assignment event is an assignment of a signal value to a signal. Thus, the non-blocking assignment event may change the value of a signal, and may generate additional events which change signal values.” Although Feinberg does not explicitly teach simulating a “non-blocking assignment”, Banks teaches the concept of *validation*, which asks the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). When the nature of the problem to be solved includes “non-blocking assignment”, it would be obvious to a person of ordinary skill in the art at the time of Applicant’s invention to incorporate “non-blocking assignment” in the simulation of such a system. Indeed, Applicant admits that “non-blocking assignment” is a known component of the IEEE 1364-1995 standard, therefore it would have been obvious to incorporate “non-blocking assignment” in a simulation of a device compliant with IEEE 1364-1995 in accordance with principles well known in the art, such as *validation* as taught by Banks. Motivation to do so would be found in

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the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Regarding claims 5 and 6, Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9). Activity scanning is regulated by time increments, thus cycle-based. It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based and/or cycle-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

6. Claims 13-17 recite the methods employed by the system of claims 2-6, and are therefore rejected for the same reasons given above for claims 2-6.

7. Claims 31-35 recite system limitations corresponding to those of claims 2-6, and are therefore rejected for the same reasons given above for claims 2-6.



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8. Claims 23-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg in view of Banks.

Regarding claims 23-27, Feinberg teaches a distributed simulation according to the claimed invention. In particular, Feinberg teaches a distributed simulation with a plurality of nodes, the nodes are configured to simulate portions of a system under test, the simulator programs on different nodes use different instruction code, the nodes communicate during the simulation, and the control computer acts as a hub (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-67; column 7, lines 20-27).

The specification (page 24, lines 25) teaches a “non-blocking assignment” as “The non-blocking assignment event is an assignment of a signal value to a signal. Thus, the non-blocking assignment event may change the value of a signal, and may generate additional events which change signal values.” Although Feinberg does not explicitly teach simulating a “non-blocking assignment”, Banks teaches the concept of *validation*, which asks the conceptual model (simulation) is an accurate representation of the real system (§ 1.7, page 17, 7. *Validated?*). When the nature of the problem to be solved includes “non-blocking assignment”, it would be obvious to a person of ordinary skill in the art at the time of Applicant’s invention to incorporate “non-blocking assignment” in the simulation of such a system. Indeed, Applicant admits that “non-blocking assignment” is a known component of the IEEE 1364-1995 standard, therefore it would have been obvious to incorporate “non-blocking assignment” in a simulation of a device compliant with IEEE 1364-1995 in accordance with principles well known in the art, such as *validation* as taught by Banks. Motivation to do so would be found in the nature of the system

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for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9). Activity scanning is regulated by time increments, thus cycle-based. It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based and/or cycle-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

9. Regarding claims 28-29, Feinberg teaches a distributed simulation according to the claimed invention. In particular, Feinberg teaches a distributed simulation with a plurality of nodes, the nodes are configured to simulate portions of a system under test, the simulator programs on different nodes use different instruction code, and the nodes communicate during the simulation (Figs. 2-4; column 3, lines 38-46; column 4, lines 48-67).

Feinberg does not explicitly teach whether the simulations shown are event-based or cycle-based. However, Banks teaches that cycle-based simulations are well known in the art (§ 1.4.3 Activity Scanning, page 9). Activity scanning is regulated by time increments, thus cycle-

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based. It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to use simulation techniques well known in the art, such as those found in a handbook of simulation, to design a simulation. Therefore it would have been obvious to build a distributed simulation system as taught by Feinberg, using event-based and/or cycle-based simulations. Motivation to do so would be found in the nature of the problem, such as the nature of the system for which the simulation is being designed, as well as the knowledge of a person of ordinary skill in the art.

10. Claims 9-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg as applied to claim 7 above and further in view of "Concepts of Programming Languages" by Robert Sebesta (Sebesta).

Regarding claims 9-11, these claims describe the grammar by which Applicant's simulation nodes communicate. Official notice has been taken regarding the use of grammars for computer communication. See Sebesta, chapter 3. The use of a grammar for computer communication is so well known that the Examiner is unaware of any computer communication protocol that does not use a grammar. The details of implementation in a grammar would have been obvious to a person of ordinary skill in the art in combination with his own knowledge of the particular art. Motivation for designing a grammar that enables the invention to function as intended would be found in the nature of the particular problem to be solved by the invention as well as the knowledge of a person of ordinary skill in the art.

11. Claims 20-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg as applied to claim 19 above and further in view of "Concepts of Programming Languages" by Robert Sebesta (Sebesta).

Regarding claims 20-22, these claims describe the grammar by which Applicant's simulation nodes communicate. Official notice has been taken regarding the use of grammars for computer communication. See Sebesta, chapter 3. The use of a grammar for computer communication is so well known that the Examiner is unaware of any computer communication protocol that does not use a grammar. The details of implementation in a grammar would have been obvious to a person of ordinary skill in the art in combination with his own knowledge of the particular art. Motivation for designing a grammar that enables the invention to function as intended would be found in the nature of the particular problem to be solved by the invention as well as the knowledge of a person of ordinary skill in the art.

12. Claims 1-6, 9-17, and 20-35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Feinberg et al. in view of US Patent No. 5,991,533 to Sano et al. (Sano).

Feinberg teaches a distributed simulation system which anticipates the structure of the claimed inventions of 1-29. Feinberg teaches several applications for this distributed simulation system, and it would be obvious to a person of ordinary skill in the art at the time of Applicant's invention that Feinberg's distributed simulation is suitable for verification of electronics. The dependent claims recite details of implementation that would have been obvious to a person of

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ordinary skill in the art of simulation and verification when developing a verification tool for a particular application.

Additionally, Sano teaches a verification system for, among other things, IEEE-1364 (column 24, lines 49-59). The dependent claims recite details of implementing a verification of a device conforming to IEEE-1364 specifications. It would have been obvious to a person of ordinary skill in the art combine the teachings of verifying an IEEE-1364 device, taught by Sano, with a distributed simulation system, taught by Feinberg. This combination would be an application or intended use for the distributed simulation system of Feinberg. Motivation to do so would be found in the nature of the problem to be solved, as verification and simulation are well known to be computationally intensive and distributed computing systems are well known to have advantages in this regard.

### *Conclusion*

Art considered pertinent by the examiner but not applied has been cited on form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-3713.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Proctor  
Examiner  
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